# MISSOURI DEPARTMENT OF NATURAL RESOURCES
# AIR AND LAND PROTECTION DIVISION
# ENVIRONMENTAL SERVICES PROGRAM
## Project Procedures

EFFECTIVE DATE: January 30, 2003

TITLE: Collection and Handling Procedures for EPA Region VII Ambient Fish Tissue Monitoring

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SUMMARY OF REVISIONS: Not applicable as this is a new document

APPLICABILITY: The procedures outlined in this document apply to all WQMS personnel who collect fish for the EPA Region VII Ambient Fish Tissue Monitoring Program.

DISTRIBUTION: MoDNR Intranet
ESP FSS Section Chief
ESP SOP Coordinator

RECERTIFICATION RECORD:

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| Initials | | | | |

## 1.0 SCOPE AND APPLICABILITY

1.1. The purpose of this document is to establish uniform procedures for the collection, identification, and preservation of whole fish and fish tissue (fillets) that are to be chemically analyzed. All methods and procedures described herein are in accordance with the United States Environmental Protection Agency's (EPA) Regional Ambient Fish Tissue Monitoring Program (RAFTMP) and the Missouri Department of Natural Resources' (MDNR) Water Pollution Control Program's (WPCP) Quality Assurance Project Plan for Fish Tissue Monitoring. A copy of the RAFTMP document is located in the file of the WQMS staff person responsible for the collection activities. All analyses of whole fish and fish tissue are performed by EPA's Region VII analytical laboratory.

1.2. The fish collection is part of an ambient monitoring program that includes both trend station samples (to document change over time) and status station samples (for determinations of possible health risks from consumption). Trend station samples consist of whole fish while status station samples consist of fillets. Fish are primarily collected by means of commercially manufactured electrofishing units but angling, seines, or other netting methods may be used if necessary. The Water Quality Monitoring Section utilizes either a boat-mounted electrofisher unit manufactured by Smith-Root, Inc. or a backpack-mounted unit manufactured by Coffelt Industries.

1.3. Site selection consists of a combination of established long-term trend stations sampled biennially and specific water bodies selected by the Water Pollution Control Program for status stations.

1.4. Safety is a key element when implementing fish collection activities due to the presence of water and electricity. Boat safety is another consideration when operating the boat-mounted electrofisher.

## 2.0 PERSONNEL QUALIFICATION

2.1. The team leader must have experience in the proper operation and maintenance of the boat and outboard motor and also the specialized electrofishing units. See the Outboard Marine Corporation *Operation and Maintenance Manual* and the appropriate instruction manual for the type of electrofisher being used. The team leader must also receive formal training on electrofishing theory and techniques as provided by the United States Fish and Wildlife Service (USFWS) manual entitled *Principles and Techniques of Electrofishing* and be familiar with taxonomic keys for fish identification (see the Missouri Department of Conservation (MDC) publication, *The Fishes of Missouri)*.

2.2. The sampling crew must be knowledgeable in the overall scope and purpose of collection activities and aware of proper operation of equipment and methods

employed while conducting collection activities. Responsibility for training of the sampling crew rests with the team leader and the project plan's sampling operation officer.

2.3. Personnel responsible for the collection activities must have a valid MDC Wildlife Collector's Permit. The permit should include the names of all personnel that may participate in the collection activities.

## 3.0 HEALTH AND SAFETY

3.1. General safety issues to be addressed prior to sampling should include knowledge and experience in safe boating practices (see Department of Public Safety, Missouri State Water Patrol, *Missouri Watercraft Manual*) and the proper operation of electrofishing equipment (see MDNR-WQMS-013 *Procedures for Using the Smith-Root, Inc. Boat-Mounted Electrofishing Unit* and MDNR-WQMS-014 *Procedures for Using the Coffelt, Inc. Backpack-Mounted Electrofishing Unit*). Staff must be aware of the hazards inherent in working on and in water with electrical current. It is the responsibility of the team leader to inform the sampling assistant (or crew) of proper safety procedures and techniques used in operating the electrofishing equipment and the outboard motor and boat.

3.2. Personnel participating in collection activities must be certified in both the American Red Cross standard first aid and cardiopulmonary resuscitation. Participation in the MDNR medical monitoring program in accordance with the Air and Land Protection Division medical monitoring policy is required.

3.3. Personal safety equipment including life jackets, rubber electrical lineman gloves, hearing protection, and rubber boots must be worn at all times during the electrofishing collection process.

## 4.0 GENERAL OVERVIEW

4.1. Fish are collected for chemical analyses as indicators of the quality of ambient water and sediment. The chemical analyses of fish tissue are performed to detect the presence of contaminants that may have an adverse effect on aquatic life and may pose hazards to humans from consumption of fish.

4.1.1. Whole fish are analyzed when the objective of the program is to either determine if there is an aquatic life impact or as an early warning screening mechanism (trend sample).

4.1.2. The fillets of fish are analyzed when the objective of the program is to determine the presence of specific contaminants in the edible portions of fish that may cause a potential hazard to human consumption (status sample).

4.2. The species and size of fish to be collected will depend on the type of sampling activity (trend vs. status) and the number and type netted during the actual sampling. When possible the same species should be collected as was collected in the previous years at each station. For trend samples, the size of fish collected should be between 16 and 21 inches with the smallest specimen no less than ¾ the length of the largest. Status samples should consist of legal sized specimens if possible, otherwise the size selected should be large enough to fillet easily. The sample size of very large fish should be limited to three specimens due to the difficulty in processing. Carp and redhorse suckers are the preferred bottom feeding species (trend and status samples) but other species such as buffalo, drum, catfish, or other suckers may be collected if the preferred species are unavailable. Status sampling requires that a second sample of a predator species (bass, bluegill, crappie, etc.) also be collected. Catfish, an omnivore, may also be collected if other predators are unavailable. If follow-up sampling is required at a status station site the same species should again be collected, if possible.

4.3. The Quality Assurance Project Plan (prepared by WPCP) lists the sites to be sampled for both trend and status sites. There are nine trend sites the WQMS staff samples every two years. Four sites are sampled during even numbered years while the remaining five sites are sampled in odd numbered years. Five additional sites are selected each year by the WPCP to make up the status sites. These may vary year to year depending on the data needs of the program.

4.4. Extreme care must be taken to ensure that samples collected do not become contaminated during the sampling activities or during the processing and storage prior to analyses. It is also important that all processing of samples be conducted according to the EPA's RAFTMP and that all pertinent information be recorded in a bound field notebook.

4.5. The field notebook shall be kept within the WQMS and be available for inspection by the WPCP project officer.

## 5.0 SURVEY PREPARATION

5.1. Prior to initiating collection activities the Environmental Specialist assigned to the project should review the current QAPP and determine a schedule for reconnaissance visits (if needed) and sampling trips. A reconnaissance trip is suggested if the Specialist is unfamiliar with the water body or stream segment so that the appropriate sampling equipment may be used at the site.

5.2. The Specialist assigned to the project should have all the appropriate EPA labels, sample collection field sheets, and chain-of-custody forms prior to the start-up of collection activities. Questions regarding the EPA RAFTMP documents may be directed to either the EPA or WPCP Project Officer.

5.3. The holder of the Wildlife Collector's Permit is required to give advance notification to the MDC Conservation Agent in the county where the collection is to be made. If the agent cannot be reached the MDC regional supervisor should be contacted. A list of agents and regional supervisors can be obtained from the Enforcement Division of MDC. Notification shall also be given to the appropriate MDNR regional director.

5.4. All supplies and equipment needed for collection activities must be checked for cleanliness and operation. A checklist of supplies and equipment is included as Appendix A.

## 6.0 SUMMARY OF METHOD

6.1. Fish collection activities usually begin in late summer or early fall at the designated sampling locations. All trend sampling locations and those status sites that have been sampled previously have Global Positioning System (GPS) coordinates recorded in a bound field notebook maintained by the ESP. For the purposes of this project a sampling station is defined as an area one-half mile upstream and one-half mile downstream of a specific point on a stream or river or one-half mile on either side of a specific point on the shoreline of a lake. All new status sites require that the sampling team record the GPS coordinates at the approximate center of the sampling area along with a detailed legal description for entry into the EPA database.

6.1.1. The one-mile sampling station definition assumes there are no interferences (natural or man-made) that would cause the quality of the water or sediment to be different. These interferences would include dams, waterfalls, etc.

6.1.2. When sampling trend stations, it is important that the samples be collected as close to the same point as possible to allow valid comparison of data.

6.1.3. In the event a sample cannot be collected within the one mile sampling area, fish should be collected as near as possible to the designated location. The new location should be accurately described in the field notes for later documentation.

6.2. When collecting samples with the Coffelt, Inc. backpack-mounted portable electrofisher refer to SOP# MDNR-WQMS-014, *Procedures for Using the Coffelt, Inc. Backpack-Mounted Electrofishing Unit* for proper set-up and operation.

6.2.1. The sampling team will consist of the specialist assigned the project and at least one assistant. Additional personnel may be required if the stream or lake is sufficiently large to necessitate blocking areas off using seines, etc.

6.2.2. Collection efforts should be concentrated in areas with suitable cover that can be easily waded.

6.3. When using the Smith-Root, Inc. boat-mounted electrofisher refer to SOP# MDNR-WQMS-013, *Procedures for Using the Smith-Root, Inc. Boat-Mounted Electrofishing Unit* for proper set-up and operation.

6.3.1. The sampling team will consist of the specialist assigned the project and one assistant.

6.3.2. Collection efforts should be in areas of suitable cover or near shorelines for the best results.

## 7.0 SAMPLE HANDLING AND PRESERVATION

7.1. Care must be taken during fish collection, identification, and packaging to avoid contamination.

7.1.1. The specialist should ensure that hands are clean and free from gasoline and/or oil before handling fish. Disposable latex, nitrile, or vinyl gloves are recommended.

7.1.2. Surfaces on which collected fish are placed for identification and packaging must be clean and should be covered with aluminum foil (shiny side out) or other suitable material to prevent contamination.

7.1.3. Fish to be held as sample specimens should be rinsed with ambient water to remove any foreign material from their exterior.

7.2. Prior to identification and processing, collected fish should be kept in a holding container with adequate water to cover the gills. The holding container should be rinsed with water from the site prior to fish collection. Frequent additions of fresh water will aid in the survival of those specimens released due to incorrect species or size.

7.3. Collected fish must be identified to species (see the MDC publication *The Fishes of Missouri).* The identification will be noted on the field sheet and chain-of-custody form.

7.4. When preparing a sample for status sampling (fillets) the weight (to the nearest gram) and length (to the nearest centimeter) of each whole fish is to be recorded. The length shall be measured from the nose (with mouth closed) to the tip of the tail (with tail fin compressed). A notation must also be made on the field sheet as to whether the outer skin is attached to the fillet or not. (Note: Skin should be removed unless noted otherwise.)

7.5. Trend station samples (whole fish) are to be individually double wrapped with heavy-duty aluminum foil. If extra heavy- duty foil is used a single sheet is adequate. The wrapped fish that comprise a sample will be placed in a clean heavy-duty trash bag and the bag sealed with strapping tape or wire. The bag should be labeled with the date, time, sample location, and number and type of fish.

7.6. Individual fillets from a status sample may be placed together and wrapped in aluminum foil as described in 7.5. The fillets shall be rinsed with distilled or deionized water to remove any contamination from the filleting process prior to packaging. The foil wrapped package can then be placed in a zip-lock plastic bag and labeled appropriately.

7.7. The samples must be put on ice immediately and frozen as soon as possible after collection. If they cannot be frozen immediately, the time between collection and freezing must be noted in the specialist's field notes and also on the appropriate field sheet.

7.8. Areas to be addressed in the field notes may include but are not limited to:

- date and time of notation
- appearance/odor of the water
- watershed characteristics
- condition of the fish
- presence of parasites on fish
- condition of boat ramp, etc.
- weather conditions
- length of time samples are on ice
- personnel participating
- weight and length of fish to be filleted
- GPS coordinates

## 8.0 QUALITY CONTROL

Duplicate samples will be collected as per instructions in the field sheets supplied to the ESP annually by the EPA project officer.

## 9.0 SURVEY COMPLETION

Upon return from a survey, all unused supplies and clean equipment will be returned to the appropriate storage area. Soiled equipment will be cleaned and malfunctioning equipment will be marked and the Water Quality Monitoring Unit Supervisor notified. If more than one site is sampled in a day, all equipment must be cleaned before proceeding to the next location.

## 10.0 REPORTING

No reports are required by the WPCP.

## 11.0 TRANSFER OF SAMPES TO EPA LABORATORY

After completion of the year's sampling activities, notice should be given to the EPA Project Officer and arrangements made for the transfer of all samples to the EPA Laboratory in Kansas City, Kansas. The field sheets and chain-of-custody can be completed from the field notebook at the conclusion of the year's sampling and turned in at the time the samples are transferred.

## 12.0 REFERENCES

Outboard Marine Corporation, *Operation and Maintenance Manual*, 1994

USFWS, Office of Training and Operations, *Principles and Techniques of Electrofishing*

Pflieger, Wm. L., 1975. *The Fishes of Missouri*, Missouri Department of Conservation

Department of Public Safety, Missouri State Water Patrol, *Missouri Watercraft Manual*, August 1994

MDNR-WQMS-013 *Procedures for Using the Smith-Root, Inc. Boat-Mounted Electrofishing Unit*

MDNR-WQMS-014 *Procedures for Using the Coffelt, Inc. Backpack-Mounted Electrofishing Unit*

MDNR, WPCP, *Quality Assurance Project Plan for Fish Tissue Monitoring, Fiscal 2003*

USEPA, SVAN Region VII Laboratory, *Regional Ambient Fish Tissue Monitoring Program (RAFTMP) Sampling Plan,* 2002

# APPENDIX A

Supplies for Fish Tissue Processing

- Fish identification book
- Cutting board
- Measuring board
- Scales for weighing
- Electric fillet knife (AC and DC models) and adapters
- Batteries (both 12-volt deep-cycle and 9-volt)
- Regular fillet knife and sharpener
- Fish skinning pliers (for catfish)
- Nitrile or vinyl gloves
- Extra heavy duty or heavy duty aluminum foil
- Heavy duty trash bags and ziplock bags
- Cooler(s) for samples
- Chain-of Custody forms, tags, tape, etc.
- GPS unit
- Field notebook
- Distilled or deionized water
- 5-gallon buckets
- Paper towels